



Weighing the evidence

Background reading for teachers

This reading gives you the background for each case, with sources you can check.

Rays and scallops

Myers and others (2007) linked declines of great sharks to increases in cownose rays and the collapse of a North Carolina bay scallop fishery. Grubbs and others (2016) found the timing of shark declines and ray increases did not match, and that the purported cascade lacked empirical support.^{1, 2}

Sunscreen

The 2022 National Academies review found there is no regulatory definition or oversight for 'reef-safe'.³ The Smithsonian notes that toxic levels in lab studies are much higher than concentrations measured in the environment, and that mass bleaching clearly occurs during marine heatwaves, while more subtle impacts are harder to rule out.⁴

Microplastics and perch

Lönnstedt and Eklöv's 2016 Science paper claimed perch larvae preferred microplastic particles to their natural food. Science issued an expression of concern in December 2016 and retracted the paper in May 2017, after Sweden's Central Ethical Review Board found scientific dishonesty. Uppsala University later found the results were fabricated.⁵

Mantis shrimp

Thoen and others (2014) showed that mantis shrimp, despite 12 photoreceptor types, discriminate between colours poorly compared with humans, suggesting a different way of processing colour.⁶

Sources

1. Myers, R.A. and others (2007). Cascading effects of the loss of apex predatory sharks from a coastal ocean. *Science* 315: 1846-1850.
2. Grubbs, R.D. and others (2016). Critical assessment and ramifications of a purported marine trophic cascade. *Scientific Reports* 6.
3. National Academies of Sciences, Engineering, and Medicine (2022). Review of fate, exposure, and effects of sunscreens in aquatic environments.
4. Smithsonian Ocean. Sunscreen and coral reefs. ocean.si.edu
5. Retraction Watch (2017). Author of controversial Science fish-microplastics paper committed intentional misconduct. retractionwatch.com
6. Thoen, H.H. and others (2014). A different form of color vision in mantis shrimp. *Science* 343.

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